

The first after-market Latex Ink

for HP Designjet L25500, L26500, LX600 and LX610



How does third-party latex ink Actually function?



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Introduction: latex ink is the first successful new ink in the last ten years

Latex ink has been relatively successful in many parts of the world. In the first year or so, more than 3000 printers have been sold (all sizes, HP Designjet L25500, HP Scitex LX600 and LX800). Estimated over 1300 of them in Europe. Sales slowed down in 2012-2013 but by the end of 2013 at least 15,000 latex printers had been sold worldwide.

HP latex ink is the first innovative new ink that has achieved measurable market share in over 11 years. All other innovative inks of this decade, such as Lumocolor from Staedtler, Sepiax (from Sepiax) and Kiian inks (Kiian Manoukian) failed in the marketplace. UV-cured inks are the best example of a new ink (new in 1999) that became a billion-dollar business. UV-cured inks first became talked about in functional printers circa 1999, first were known to the wider public at DRUPA 2000, and UV-cured inkjet became a market leader by DRUPA 2004.

UV inks became a #1 signage and décor ink because there are 45 manufactures making printers for this ink. With latex ink, only one single company offered it the first four years. This situation limits the worldwide potential of latex ink: too restricted until now. But today, already in 2010 and readily available by 2011, now there are other companies offering latex ink and still other companies offering other inks that offer even more features. Mimaki is one example of a latex ink from a non-HP source. (beginning from FESPA 2012).

When latex ink initially was launched by HP (at DRUPA 2008), one concern that was voiced in many countries was, ***“only if there is an after-market latex ink will some customers even think of buying this kind of printer.”***

In many parts of the world most people will not even consider buying an eco-solvent or water-based printer unless there is after-market ink readily available. For example, in some countries, such as China, Mimaki takes off all attempts to prohibit using after-market ink. Not many people in China (or elsewhere in Asia) would pay for a Mimaki unless they know, up front, before they buy the printer, that they are reassured that they can use third-party ink if they wish to.

We understand that printer manufacturers wish to earn their profit by selling their own ink, but some print shops simply will not buy a printer if there is no after-market ink. So now (since 2010), for the first time in two years, an after-market ink is available for the HP Designjet L25500 (and now by 2014, for selected other HP latex models). In a way, this launch of an after-market ink, is an accolade from the industry to admit clearly that HP latex ink is being used by a lot of people around the world. So one result of the availability of the new after-market latex ink is that even more latex printers will be sold by Hewlett-Packard.

In other parts of the world outside Asia, such as Europe and North America, some print shop owners may wait one year before they switch to an after-market

ink, because then their warranty expires anyway. Indeed I was told that Roland increased their warranty to two years in some countries specifically to keep people buying their Roland-branded ink instead of jumping to after-market ink after the end of the first year warranty. But if the after-market ink company for latex ink offers tech support, then the official warranty year is no longer a reason to wait. Indeed one print shop that we inspected switched to after-market latex ink within a few weeks of buying their HP Designjet L25500, and has been happy and contented using it every week every month since then. However they had access to direct tech support from Sam-Ink.

In most countries it is considered a basic legal right for a person who buys a printer to be allowed to use whatever ink he or she wishes. The printer manufacturer is usually freed from having to warranty the use of their printer for after-market ink, but in some respects it is illegal to make it impossible to use after-market inks. But again, if there were absolutely no after-market ink, this would be not beneficial for HP, no matter how awkward it is to realize this. Mutoh and Mimaki are best-sellers in China and nearby countries in Asia, and compete with the cheap made-in-China printers, precisely because especially Mimaki has removed all their pretense to disallow third-party inks. In effect Mimaki wants their message to be loud-and-clear: we can offer you original Mimaki inks, but if you prefer to use after-market inks, we will not obstruct your right or desire to do so.



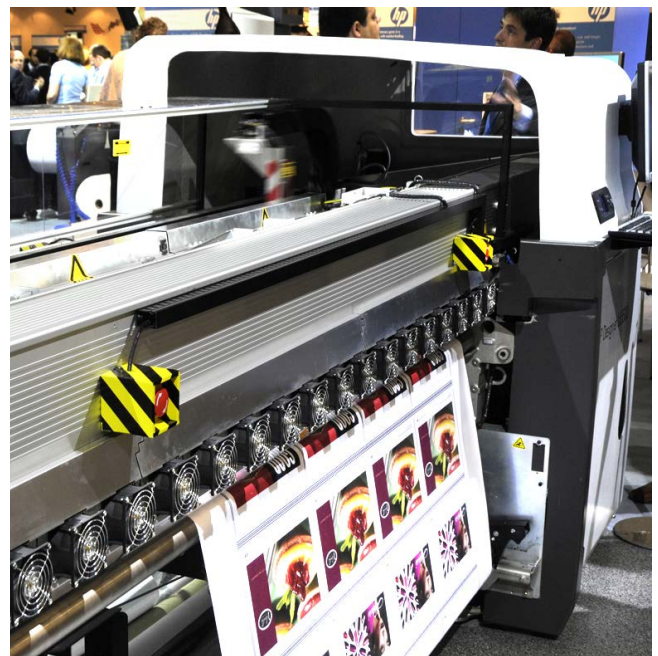
Ink vat where latex ink is being made.

What is latex ink?

It is understandable why a manufacturer does not tell the world what company supplies the inks they use; or even the chemicals. It is also not a surprise that a bit of smoke-and-mirrors hangs over a really innovative ink. The word latex is the best example: I would prefer to call this a dispersed polymer resin ink. Because the minute you recognize that "latex ink" is simply a normal and common water-based dispersed polymer resin, you can understand how an after-market ink company can indeed make a third party ink without even needing to know precisely which chemistry company in Germany provides HP their chemicals: the basic chemistry of latex ink is ordinary polymer resin chemistry. Any really capable ink chemist with knowledge of water-based inks and of polymer resins can reproduce it.

Remember, there were three other companies already making latex ink (for Epson DX printheads) as early as three years before Sam-Ink offered their after-market ink. I have been inside two R&D labs of companies with latex ink (one is a Fortune 500 company). And this was already several years ago. So any knowledgeable ink chemist and any experienced ink company can make whatever ink they wish to focus on. It is the chips in the cartridges which are the tough part, but even this hurdle is being overcome.

Despite it being relatively straightforward for a chemist to replicate latex ink, it is even more remarkable how well the secret was kept for two years (DRUPA 2008 to SGIA 2010 when the first after-market latex ink was shown, fully-functional, to the public). Normally I can find out the origin of just about any printer, or ingredients of most inks, or substrates. Sometimes it takes 45 minutes, occasionally a few days. But I find out sooner or later. But as a courtesy we do not publish this information if not appropriate. So for HP latex ink we do not publish the source of the chemicals, for two reasons: as a courtesy and ironically this is the first ink that I do not (yet) know the precise source of all the chemicals. If you spend 30 minutes at any trade show you will get the usual rumors: maybe Dupont, maybe a German chemical company.



Here you can see, the first images FLAAR took of Latex inks two years ago at DRUPA 2008, it was the first trade show where HP exhibited their Latex inks and their latex ink printer.

Why Dupont? Because they were the source of VinylJet ink for Encad's unsuccessful attempt to make the first latex-like ink about 10 or so years ago. However Dupont is no longer considered the probable source. Why a German chemical company? This is simply what almost all other ink chemists and industry analysts say is what they think could be the source. But actually it makes no difference which European or Japanese chemical company provides the chemicals, the fact is that the chemicals are commonplace and there are a dozen different chemical companies that make these same specific chemicals. In other words, there is no need whatsoever to use the same source as HP does since the same chemicals are readily available anywhere and everywhere else.

Why so long for an after-market ink to be produced?

No ink company will waste their time making an ink if there are only a few hundred printers that use this ink. So for the first years everyone simply waited to see whether HP latex ink would be a success, or a dud. The consensus already by December 2010 is that the ink is relatively successful. Please note: this does not mean whether the ink is popular; it does not mean whether the ink is beloved. It only means that 3000 to 4000 people could not find, in 2008, 2009, or 2010, any other alternative. The alternatives (Sepia resin ink) have not been widely available in resin-capable printers. The Sepia printers available in 2010 are relatively limited: retrofitted-Epson printers out of the UK and a few other modified printers. Resin ink will only become a breakaway best seller when new printers are designed, engineered, and manufactured from the ground up to use Sepia ink. However in the meantime, Sepia was not able to find any printer manufacturer to partner with, so by late 2013 they sold themselves to a consortium in Europe. Other than GO (Graphics One in the USA, and for Latin America) there is not really much Sepia available for normal sized printers with DX printheads. The GO X-24 and then GO X-245 offer Sepia ink.



*SAM*INK is an example that LATEX ink can be reproduced if you have the experience.*

Do after-market latex inks actually function?

Four or so years ago I visited a print shop and noticed an unusual ink. I asked the owner why this ink looked different. He said "Oh, this is a new latex ink we are beta testers for." I then asked if I could print some samples, and he said yes. The printer was a Roland, using Epson piezo printheads.



Here is FLAAR testing the first attempt at latex ink, circa 2007-2008. This is not in China and not in Singapore. This ink company later decided not to continue trying to make a latex ink for Epson printheads.

Does this mean latex ink works with Epson DX4 and/or Epson DX 5 printheads? Yes and no: the year 2007 experiment was not successful, in part because it was too early, in part because the ink company was still gaining experience. But since then I have been told that another company is retrofitting Mimaki printers to utilize HP latex ink: official latex ink from HP for thermal printheads being used on piezo heads?? (so not an after-market ink; this was before after-market latex ink was made available by Sam Ink in Singapore).

But I have not visited this Mimaki-oriented print shop, and as we enter 2011, there is no real need to outfit a Mimaki printer to use latex ink from HP when you can more easily outfit Mimaki, Mutoh, Roland, and Epson printers to use resin ink from Sepiax. Besides, now you can get Mimaki's own sourced latex ink for the Mimaki latex printer (which uses Ricoh printheads). Plus Sepiax is not made to work for HP thermal printheads. So for an after-market ink for the HP Designjet L25500, the first available appropriate ink is from Sam-Ink in Singapore.

Does it work? For past years the initial issue was getting the chips in the cartridges to work inside an HP printer. Nozzle clogging was another issue. But in several printshops which I have inspected myself, I saw this after-market ink being used successfully day after day while I was in Singapore, and the same latex ink worked just fine in the HP Designjet L25500 printer in the SAM*INK booth at SGIA. The printshops in Singapore obviously got tech support (if needed) direct from the manufacturer. So be sure your source of Sam Ink is trained to provide tech support.



For the present report the FLAAR team at SGIA (of six people) inspected the HP Designjet L25500 in the booth of Sam Ink at SGIA during three days. They even printed some of our own photographs.

Then I flew to Singapore to spend an entire week studying both the ink R&D facilities, and a printshop that was using the latex ink. The owner of the printshop had a relatively new HP Designjet L25500 latex ink printer. He had no hesitation using the after-market ink because he was already using other Sam Ink in his two HP 9000s mild-solvent printers.

The first sample prints we did were at SGIA. We wanted to do more sample prints in Singapore, but the image files were so large they did not upload. So as soon as these image files can be printed, we will add more illustrations to this report.

There will also be a brief video of Nicholas inspecting the HP Designjet L25500.



So the after-market latex ink works well in the print shop in Singapore, works in front the whole world in the booth of Sam*Ink. But some aspects of the latex ink are still being worked on during 2011. Indeed HP itself had to reformulate the latex ink for their HP Scitex printers. Be sure to realize that the latex ink for the heavy duty HP Scitex printers is not the same as the latex ink for the 42" and 60" Designjet printers (which are no where near as sturdy as the HP Scitex models). Sam*Ink is presently making ink only for the 42" and 60" models.

As soon as the latex ink is available through Sam*Ink on the open market, it is essential that we inspect print shops which are utilizing this ink, so we can report on how it functions. At present we have only inspected the ink in print shops in Singapore, which is the same city as the ink production facilities and full tech support.

Recent Inspection of another print shop using Sam-Ink in an HP Latex Ink printer

I always remember this print shop location since Singapore has unique multi-story structures which house factories, shops, store rooms, and other businesses. In the USA these would be one or two-story buildings with parking out front. In Singapore they are four to five stories, like a giant shopping center. And parking is on every level directly in front of or alongside the business.

The owner of the print shop was informative: "heat generated by curing unit for HP latex is not always an issue." "After research the printer is easier to use." "More manageable, most things are printed by just one person."

"ICC Profiling is very important." "But doing the profiles ourselves takes too much time. So we use the profiles of the materials supplier." "We prefer to focus on our printing projects."

This experienced user of HP latex printers, said that there is a tad of a learning curve, but if you are patient you can overcome the issues. For example, if media gets wavy because of wrong heat for curing, the HP ink will not stick.

He now has plenty of experience, and now uses after-market latex ink from SAM*INK.

The owner said he was used to HP printers via having used an HP Designjet 5500 over a decade ago.





HP DesignJet 26500



HP DesignJet 26500

Print shop which had a latex printer

Who and what is SAM*INK?

I first noticed Sam Ink in the Dubai sign and graphics expo many years ago. I go to the Dubai expo every year. I kept noticing the yellow-colored logo shirts and the yellow-colored packaging for their ink. So out of curiosity I struck up a conversation.

International trade shows are to some degree like an international fraternity. You go to distant cities all around the globe, and in each far-away place you end up meeting exactly the same people: the substrate manufacturers, the printer manufacturers, the ink manufacturers. When one of them wears a subtle yellow-colored shirt at each city around the world you gradually remember their branding. Since I am curious about ink, I arranged a meeting at Sam's ink company in Singapore. Here, in May 2010, I quickly learned that this is a reputable company that produces a reliable ink.

In this initial visit I have noticed a strong team of university graduated specialists with degrees in Chemistry, Materials Science Engineer, Electronics Engineer, Mechanical & Robotics Engineer, Industrial Engineer, Accountant, and Economist, with different religions, cultures, nationalities, and traditions all working harmoniously together. Singapore is a great place to meet people from diverse countries.

SAM*INK is passionate about recycling. Every year, more than 300 million cartridges end-up in landfills around the world. Over 100 cartridges are thrown away every second. While the company can never completely stop them from entering the waste stream, they can at least stem the flow by re-using them many times.

The annual ISO9001 ink-manufacturing status has been continually audited and certified over 5 years. I also witnessed the extensive training and examination of franchise personnel. A new technician can be taken through the 5-day training program and learn enough to start changing spare-parts. The repair technicians do not return to their home countries until they pass the SAM*INK hands-on printer-repair certification examinations.

SAM*INK franchises in different countries are successful enough to exhibit at major trade shows around the world. Its franchises continually exhibit at major trade shows at ISA and SGIA in the USA, Sign-UK, FESPA (Europe), Canada, APPPEXPO-China, MediaExpo-India, Sign & Graphics Imaging, Middle-East (SGI, Dubai), South-East-Asia, and South America. SAM*INK is not limited to only one region. It is available in most continents and in many countries. New countries are being added every year, especially now that FLAAR Reports are available on the company and on its ink products.



SAM*INK has been a franchising company since 2003 and has relied on its franchisees to play a major role in the system's success. SAM*INK remains committed to franchising as a predominant way of doing business. Today, the SAM*INK franchise is a leading global large-format inkjet-printer service provider with more than 30 franchisees, located in more than 20 countries. In several respects a franchise for this company is a more sophisticated concept than a mere distributorship. One reason for the success of the franchise concept is because they can conduct multicultural business on a worldwide scale while maintaining a local approach. Since Singapore is itself a successful multi-cultural state, this helps show that diverse cultures can work together harmoniously.

Sam-Ink has years of experience making ink for other Hewlett-Packard printers. Here is Nicholas taking a sample from another of the Sam Ink products for other HP Designjet printers.



Here are franchise employees being trained to service an HP Designjet 9000s. We have spoken with managers of franchises in Mexico, Philippines, Abu Dhabi and USA and they are very pleased that FLAAR Reports documenting the professional atmosphere in the ink company production and training facilities are available.



Site-visit case-study of a successful print shop using after-market HP latex ink in 2014



Here are some of the pictures from our visit in 2014, while analyzing about the printers which are able to use different types of ink, HP and Mimaki are adequate for Latex.





Here are some of the pictures from our visit in 2014, where it is showing Dr. Hellmuth, Mr. Sam and people from their staff the HP Designjet L26500.





SAM*INK has been a franchising company since 2003 and has relied on its franchisees to play a major role in the system's success. SAM*INK remains committed to franchising as a predominant way of doing business. Today, the SAM*INK franchise is a leading global large-format inkjet-printer service provider with more than 30 franchisees, located in more than 20 countries.



Sam Ink booth, at D-PES Guangzhou, China 2014.



Sam Ink booth, at APPPEXPO Shanghai, China 2013.



Sam Ink booth, at SGIA, Orlando, Florida, USA 2013.



Sam Ink booth, at ISA 2013.



Sam Ink booth, at ISA 2012.



Sam Ink booth, at APPEXPO, Shanghai, China 2012.



Sam Ink booth, at SGIA, 2012.



Sam Ink booth, at Sign Sao Paulo Brazil 2011.



Sam Ink booth, at Shanghai APPEXPO 2011.



Sam Ink booth at FESPA Hamburg 2011.



Sam Ink booth at ISA 2011.



Sam Ink booth at Sign Istanbul 2010.



Sam Ink booth at SIM Abu Dhabi 2010



Sam Ink booth at APPEXPO Shanghai 2010.



Sam Ink booth at AFESPA Mexico 2010.

Contact

You can contact Sam Ink at most major international trade shows, especially ISA and FESPA Europe, D-PES in Guangzhou and other leading printer expos.

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Summary

At DRUPA 2008, when the first HP latex ink printer was released, print shop owners and managers asked me when after-market ink would be available. Many printshop owners said they would delay buying an HP latex printer until after-market ink was available. This was the HP Designjet L65500 (now the HP Scitex LX600).

Same at SGIA 2009, when the first 42" and 60" HP Designjet L255000 latex ink printers were shown in the USA. Some printshop owners and managers said they would prefer waiting until an after-market latex ink is available.

Now, since SGIA 2010, an after-market latex ink is available for the HP Designjet L25500. By early 2011 an after-market latex ink will be available for the HP Scitex LX600 and LX800. My present report covers the L25500 only. I will need to return to another printshop to test the ink in an LX600 or LX800. Plus today in 2014 (and since late 2013) there is the even newer HP latex ink for the HP Latex 3000 printer.

Also realize that HP has changed the names of all their latex printers; HP is doing away with the venerable Scitex brand name. And for latex printers. HP is removing the word Designjet.

So the availability of an after-market latex ink now opens the door for increased sales of the actual printer, the HP Designjet L25500. Indeed there is now a first-edition of a FLAAR Report on the L25500. We have been waiting since before DRUPA 2008 for access to a latex printer to write a report. The access offered to us during training by HP two years ago never materialized, so it was a year before we could write-up the L65500 (then renamed HP Scitex LX600). Then we waited another year for the L25500. Now that access was facilitated in Singapore, we can finish the first edition on the HP Designjet L25500 (first edition means there will be follow-up editions as we gain even more experience).

HP latex ink printers are a tad complicated. Handling the heating and curing do require patience. There is definitely a learning curve. But if your local SAM*INK latex ink franchise has factory training in Singapore, they should be able to assist you. I will repeat this aspect: it is absolutely essential that the local franchise be familiar with all the quirks of HP latex ink curing. They must know the RIP software and the firmware settings too. It is not advisable to use an HP latex printer without a backup, so be sure the SAM*INK franchise in your world area has training and experience in cartridge chip activation and how to avoid clogged nozzles. And if you have several HP latex printers all in one location, you too can probably get training (in Singapore, frankly the flight is worth it, especially if you travel by Singapore Air, one of the best airlines in the world, comparable to Emirates).

What counts is that have patience if you are willing to learn from experience, especially now in 2014 as everyone has more experience with the printers and with the ink chemistry.





Appendix A

The Ingredients of latex ink,
Courtesy of Sam Ink

Appendix A

Latex Ink -What it is and what it is not

Editor's comment: With permission I have copied-and-pasted this section from the web site of sam-ink.com. I have added my own comments.

When I first saw this description of the ingredients of latex ink, I estimated that the reason Sam-Ink published this for the world to see was to demonstrate that his ink team know how to make latex ink.

Equally important, they know how to make ink for HP thermal printheads. A thermal printhead is very different than all the common after-market inks for Epson piezo printheads in Mimaki, Mutoh, and Roland. However Sam-Ink also has experience in making eco-solvent ink for Mutoh and Roland (with Expson DX piezo printheads).

So now let's explore the myths and mysteries of latex inks.

1. The first latex-type inkjet inks running through a thermal printhead appeared in ISA 2003, April 3rd. Please Google Encad Vinyl-Jet 36. This latex-type ink itself was good (it was made by DuPont; was never a total secret). But it did not last very long on the market because the company was limping under tremendously intense structural changes. Kodak had recently purchased Encad and Kodak management style has bungled just about every company that it purchased (Kodak management style messed up Leaf camera and CreoScitex scanner divisions, as other examples). Plus, Kodak and Encad did not have enough clout to convince substrate manufacturers to make special substrates for the new ink. So when the Encad VinylJet 36 was launched, it did not have enough substrates to appeal to sign printers. Plus 36" width is rather wimpy for a sign printer. Overall the printer was a great idea but inadequate in about every aspect.

I still remember all the Success Stories and all the favorable PR that were published by everyone. Hmmm, why did everyone publish only favorable articles on an ink and printer that proved to be inadequate?

FLAAR was one of the few resources that was not entirely convinced.

2. Latex" is a general descriptive term for an aqueous (water) dispersed polymer.
3. The polymer exists as spherical particles and are dispersed in water.
4. The polymer is a synthetic (manufactured) material. The polymer is not natural rubber from the latex producing rubber trees. The word latex was most likely selected as a name for the ink in order to deliberately avoid using the word resin. If the word resin was used then it would be too easy for everyone to have figured out what was really the chemical ingredients. "Latex" was a great smoke-and-mirrors ploy.
5. The polymer cures (coalesces) into a film under extreme heat.
6. Polymers are molecular compounds, either natural or synthetically manufactured, that are made up of many repeating units of monomers. The development of polymer chemistry began in the 1920s with the investigation of the puzzling behavior of some materials including wood, gelatin, cotton, and rubber. For example, when rubber, with the known empirical formula of C_5H_8 , was dissolved in an organic solvent, the solution displayed several new properties, including a higher than expected viscosity, which suggested that the dissolved compound had a very high molar mass. There were many misconceptions for a number of years, until Hermann Staudinger clearly showed that there were, in fact, enormously large giant molecules, each of which contained many thousands of atoms held together by covalent bonds. Hermann Staudinger (1881-1963) was a German chemist. He is one of the pioneers in polymer chemistry. Staudinger was awarded the Nobel Prize in Chemistry in 1953.

Once the structures of these macromolecules were understood, the way was open for the synthesis manufacturing of polymers, which now pervade almost every aspect of our daily lives. About 90 percent of today's chemists, including biochemists, work with polymers.



Here you can see Dr. Nicholas holding Latex ink ingredients at SAM Ink headquarters.

7. Latexes or polymers in water dispersions serve as coatings, adhesives, and the basis for plastics and elastomers. Latex derives its name from latices. Latex particles are normally small enough to be kept in dispersion by Brownian motion.
8. For obvious reasons, neither HP nor anyone else published any list of ingredients when the ink first came out at DRUPA 2008. FLAAR did not either, since we were under NDA before DRUPA. Plus, we are not chemists, we are interested primarily in applied technology: how a technology works (or does not work) out in the real world. Besides, anyone who wants to know the chemicals inside any ink, all they have to do is have an ink testing lab, and submit samples, and they can figure out what's in the ink on their own. So even if I knew the formula for any ink, you do not need to ask anyone: just have a sample tested yourself at any ink testing facility. Besides, we do not give out ink formulas. The only reason we have this present appendix is because all this information already appeared previously on the Internet, and we simply asked permission to reprint it, with our footnotes worked into the text.
9. Basically SAM*INK® latex is synthesized by mixing monomers, surface active agents (surfactant), and an initiator (free radical source) into water. The initiator is usually activated by heat. A widely used initiator is potassium persulfate. Surfactants are molecules that have a hydrophilic end and a hydrophobic end. These form micelles in the water, with the hydrophilic end facing outward, shielding the hydrophobic portion. The surfactant can be a soap or detergent, sodium lauryl sulfate being a typical example. The turbid or hazy appearance of soap in water is due to the presence of micelles. The surfactant dissolves the oil-soluble monomer in much the same way as the soap micelles dissolve your skin's oil in ordinary toiletry. Some of the surfactant remains water soluble, as does some of the monomers. Monomer diffuses from the large droplets into the water and to the micelles. Some of it begins to polymerize on contact with the initiator (free radicals). After adding a few monomers, the much less water soluble free radical diffuses randomly into a micelle, where it begins to polymerize the monomer present there. It is terminated when a second free radical enters the micelle. The fully polymerized latex then is a submicroscopic sphere of polymer emulsified by a layer of surfactant. The kinetics of emulsion polymerization can be explained more upon request.
10. Since the chemistry and jargon gets complex quickly, FLAAR is preparing a glossary of latex ink. This glossary will also include resin ink (such as Sepiax) since latex ink of HP is simply another kind of resin ink. However we do not provide any recipe nor ingredients of Sepiax ink for two reasons: first, we are under NDA and we do not give out information that we receive under NDA; second, we would not publish any ink recipe unless the manufacturer himself publishes the ingredients first, and then gives us permission to quote this information. Third, Sepiax has changed their ink formulas about every 2 years.
11. The reason why emulsion polymerization is chosen here because (a) heat removal through the aqueous phase during the polymerization is very efficient; (b) the final latex has a very low viscosity, approaching that of water; and (c) the polymer is easily recovered via coagulation and/or film formation.
12. SAM*INK® latexes constitute a subgroup of colloid system known as lyophobic sol. They can also be called polymer colloids. The stability of these colloids is determined by the balance between attractive and repulsive forces affecting two particles as they approach one another. Stability is conferred on these latexes by electrostatic forces, which arise because of the counterion clouds surrounding the particles. Other forces of an enthalpic or entropic nature arise when the lyophobic molecules on the surfaces of the latex interact on close approach. These can be overcome by the evaporation of the water!
13. If the polymer in the SAM*INK® latex is above its glass transition temperature, it will form a film on evaporation of the water. A simple example is the drying of a latex paint on a wall! As the water evaporates, coalescence surface tension forces proceed from the presence of water menisci of very small radii of curvature. These menisci develop between the particles as the last traces of water are removed. The forces that these menisci generate drive the particles together. Interdiffusion of the polymer chains takes place, forming coherent films.
14. Latex inkjet inks contain color pigments about 200 nanometers in diameter.
15. Latex inkjet inks do not contain volatile organic compounds like cyclohexanone.

So, as you can see, latex ink is relatively straightforward. And you can easily notice that the team of Sam-Ink understand water-based chemistry in general, polymer resin water-based chemistry in particular, and thus have the chemistry knowledge to formulate and provide the world with a usable, functional (and lower-priced) latex ink. Indeed I already know a printer manufacturer who is negotiating with Sam-Ink to use a version of their ink for Epson DX 5 printhead machine.



Here is Nicholas holding the ingredients of latex ink. He is inherently curious, and although he would need to spend another year in basic chemistry class to fully understand what is in this ink, at least FLAAR makes the effort to make sure that the after-market ink companies know ink chemistry inside-out.



Appendix B

Introductory Comparative Tabulation
of the different models, 2008-2012

Appendix B

Introductory Comparative Tabulation of the different models, 2008-2012

We will update the following tabulation at ISA 2014 to include the different ink types (since there are three generations of inks). At ISA we will also be looking at the HP Latex 310, HP Latex 330, and HP Latex 360. Until we inspect them in-person they seem primarily like simply new names for the HP Designjet series. It is virtually unparalleled in the printer industry to change the name of a printer which already exists; most companies (such as Oce, for their Arizona models) wait until they at least tweak some minor feature to pretend they have a "new" model.

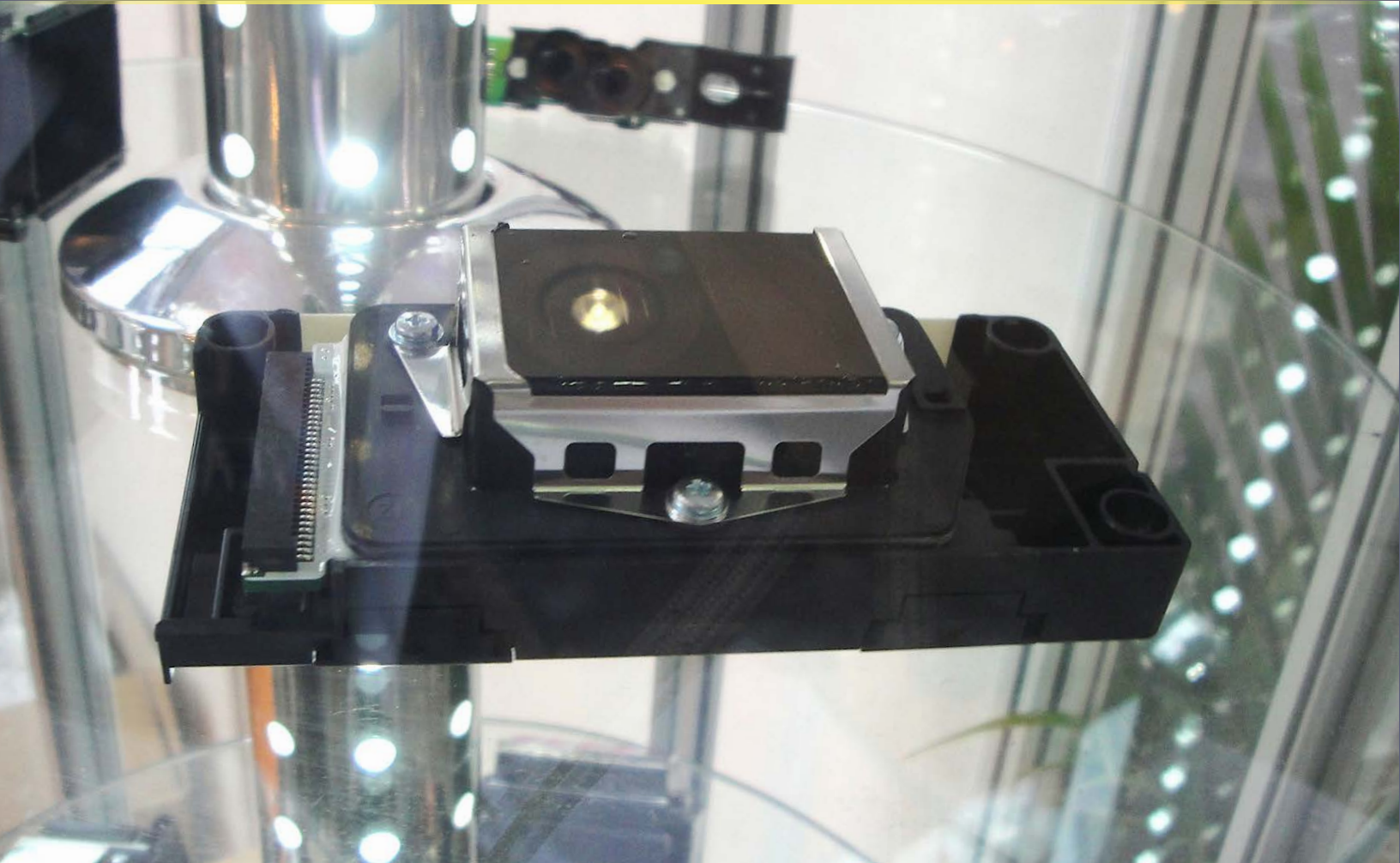
	Media width	Printhead(s)
L25500	42"	<ul style="list-style-type: none"> • CH612A HP 789 Yellow/Black Designjet Printhead • CH613A HP 789 Cyan/Light Cyan Designjet Printhead • CH614A HP 789 Light Magenta/Magenta Designjet Printhead
L25500	60"	<ul style="list-style-type: none"> • CH612A HP 789 Yellow/Black Designjet Printhead • CH613A HP 789 Cyan/Light Cyan Designjet Printhead • CH614A HP 789 Light Magenta/Magenta Designjet Printhead
L26500	60"	<ul style="list-style-type: none"> • CN702A HP 792 Yellow/Black Designjet Printhead • CN703A HP 792 Cyan/Light Cyan Designjet Printhead • CN704A HP 792 Light Magenta/Magenta Designjet Printhead
L28500	104"	<ul style="list-style-type: none"> • CN702A HP 792 Yellow/Black Designjet Printhead • CN703A HP 792 Cyan/Light Cyan Designjet Printhead • CN704A HP 792 Light Magenta/Magenta Designjet Printhead

Realize there are two completely different classes of HP Latex Printer:

- EntryLevel, based on a standard HP Designjet printer for CAD or GIS
- Sophisticated mid-range, based on Scitex and HP Barcelona R&D labs technology

There are three generations of ink (the third generation is in the HP Latex 3000 which we will add to this list after ISA 2014)

L65500	104"	<ul style="list-style-type: none"> • CC582A HP 786 Yellow/Magenta Designjet Printhead • CC583A HP 786 Cyan/Black Designjet Printhead • CC584A HP 786 Lt Magenta/Lt Cyan Designjet Printhead
LX600	104"	<ul style="list-style-type: none"> • CC582A HP LX600 Yellow/Magenta Scitex Printhead • CC583A HP LX600 Cyan/Black Scitex Printhead • CC584A HP LX600 Lt Magenta/Lt Cyan Scitex Printhead
LX800	3.2m	<ul style="list-style-type: none"> • CC582A HP LX600 Yellow/Magenta Scitex Printhead • CC583A HP LX600 Cyan/Black Scitex Printhead • CC584A HP LX600 Lt Magenta/Lt Cyan Scitex Printhead
LX820	3.2m	<ul style="list-style-type: none"> • CN667A HP LX610 Yellow/Magenta Scitex Printhead • CN668A HP LX610 Cyan/Black Scitex Printhead • CN669A HP LX610 Lt Magenta/Lt Cyan Scitex Printhead
LX850	3.2m	<ul style="list-style-type: none"> • CN667A HP LX610 Yellow/Magenta Scitex Printhead • CN668A HP LX610 Cyan/Black Scitex Printhead • CN669A HP LX610 Lt Magenta/Lt Cyan Scitex Printhead



Appendix C

SAM*INK latex ink can, potentially,
also work with Epson DX 5 printheads

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SAM*INK latex ink can, potentially, also work with Epson DX 5 printheads

I have been told there is one company that about three years ago was retrofitting Mimaki printers to accept latex ink straight from HP latex ink cartridges. This was before the after-market latex ink became available. This was also before Mimaki made their official latex ink printer (whose ink does not come from HP).

So, in theory, now there is an opportunity for Chinese printer manufacturers to make a latex ink printer, because now they can easily get the ink from Singapore. Plus, Sam Leong said he can formulate latex ink to require a bit less heat than the 125 degrees C required for some substrates by HP.

So if you manufacture, or distribute, Epson, Mimaki, Mutoh, or Roland printers, or Chinese printers that use Epson DX 5 printheads, in theory you could create your own latex ink system. Your ink is now available from SAM*INK.

I have only heard about the retrofitted Mimaki printers; I have not seen them and I have not inspected the output quality, so I can only mention this as a possibility. Obviously HP latex ink is made for thermal printheads, specifically HP heads, so I am not going to recommend it being used with a piezo printhead until I can see the retrofitted printers. But it is worthwhile mentioning the possibility.

Just realize that the extreme heat required by HP latex ink would be hard to duplicate in any low-bid printer.



This company at APPPEXPO Shanghai 2010 made a major display claiming they had latex ink printer, but the printer was only a partially finished prototype and not fully functional. Whether the ink works is hard to say because their printer's wiring looked unfinished.

Although the curing temperature of HP latex ink is 125 degrees C, the heat inside the heating unit (the resisters) can reach several hundred degrees C ! This will melt most cheap plastic printers within a few minutes, not to mention the chemical odor that the cheap plastic would ooze out before it melted.

Now you see why HP is successful; they know how to design a printer that won't automatically melt or catch on fire (I am sure one or two may melt, but it is not common; especially on the HP Scitex LX600 and LX800 models or the newer HP Latex 3000 model).

The year 2014 will offer more options to sign printing companies around the world, and FLAAR Reports are in the forefront of bringing you tips and hints of what is available. You won't read about HP latex ink in a Mimaki printer in a trade magazine.

And so far, during the first several years, no trade magazine has mentioned that Sam Ink makes an after-market latex ink. Perhaps this is why FLAAR Reports are read by more people than attend trade shows and by more people than read any one trade magazine.



Here you can see Dr. Nicholas Hellmuth evaluating SAM inks with an HP L25500 printer.



*Here you can see Dr. Nicholas Hellmuth with SAM and Mr. Cary of IndoPrint (Latex customer) evaluating SAM*INK Latex inks.*



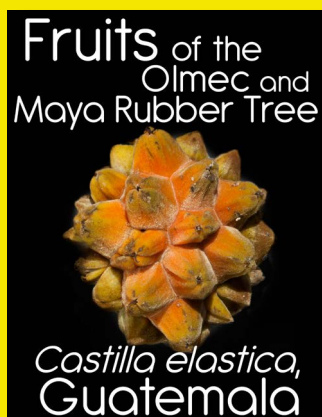
Appendix D

Latex from Rubber Trees

Appendix D Latex from Rubber Trees

HP latex ink does not come from any rubber tree (at least not as far as we know). But ironically, FLAAR works with latex chemistry direct from actual rubber trees.

There are hundreds of plants which produce a “rubber” like substance. The two best known are the commercial rubber tree from Brazil, *Hevea brasiliensis*, and the rubber tree used by the Aztec and Maya several thousand years ago. The *Castilla elastica* tree of the Aztec and Maya grows from Mexico southward through Panama. We at FLAAR do research on *Castilla elastica* in Guatemala. Our interest is what chemicals did the Maya use to make the rubber bounce (for the game balls for the infamous Maya ballgames). Rubber directly from any tree or plant does not bounce until you add other chemicals.

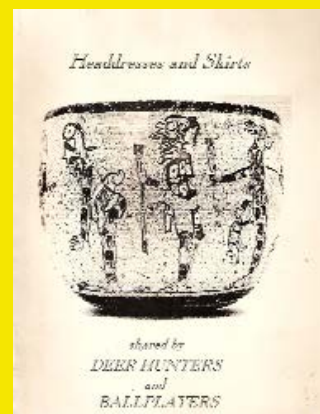
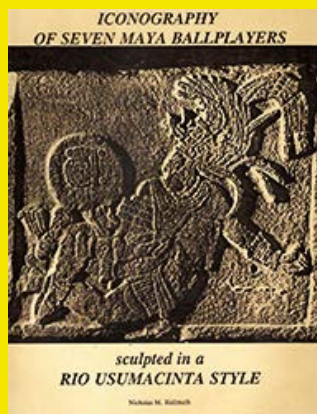
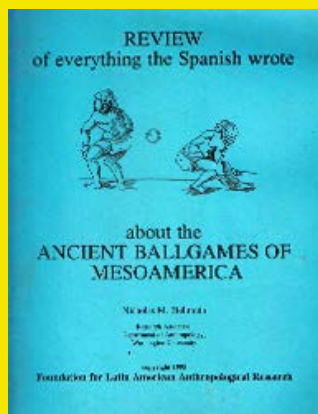
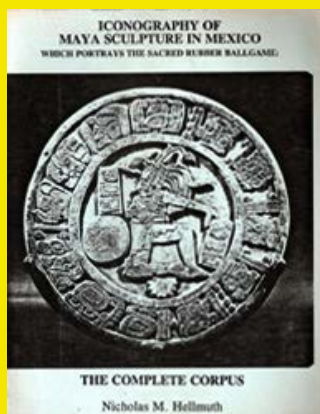


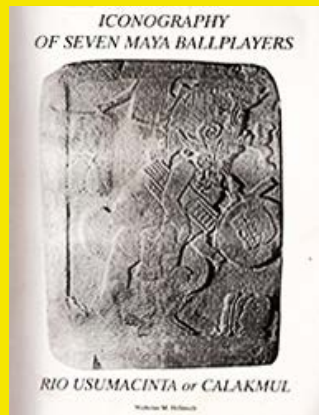
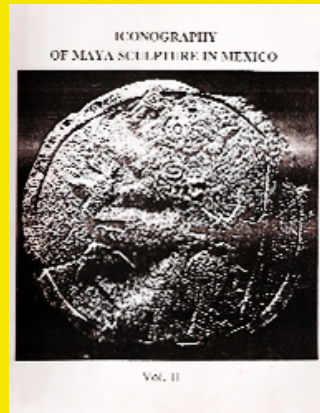
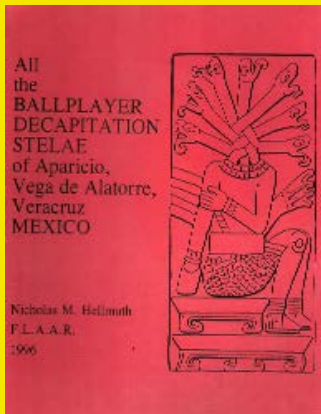
In case you happen to be interested in native Mesoamerican rubber, we will be issuing a new report later in April. The flowers and fruit pods of *Castilla elastica* are bizarre beyond belief.



We also have about a dozen publications on the rubber game played over a thousand years ago. We are preparing to re-issue these as electronic PDFs later this year, but we show them here.

Our science-oriented teams are also studying two other plants which produce a rubber-like latex: *Stemmadenia donnell-smithii* and *Plumeria rubra*. We raise the latter in our research gardens.





We at FLAAR also do research on dye colorants (to dye cotton, cloth from maguey-like plants and amate bark paper cloth). These you can see on our www.maya-ethnobotany.org web site.

We hope you enjoy our FLAAR Reports and we look forward to seeing you at ISA, FESPA in Munich, APPPEXPO in Shanghai, SGIA in Las Vegas, Sign Istanbul 2014, and Sign Middle East in Dubai in 2015.

We will also be at ITMA Asia (textile expo), Tecnargilla (ceramic printer expo), Photokina, and Glasstec.

Updated April 2014 after visiting another print shop in Singapore successfully using after-market latex ink from Sam Ink

First posted December 2010

Reality Check

Being a university professor for many years does not mean we know everything. But intellectual curiosity often leads us to enter areas that are new to us. So we do not shirk from entering areas where we are obviously not yet expert. If in your years of wide format printing experience have encountered results different than ours, please let us know at ReaderService@FLAAR.org. We do not mind eating crow, though so far it is primarily a different philosophy we practice, because since we are not dependent on sales commissions we can openly list the glitches and defects of those printers that have an occasional problem.

FLAAR and most universities have corporate sponsors but FLAAR web sites do not accept advertising, so we don't have to kowtow to resellers or manufacturers. We respect their experience and opinion, but we prefer to utilize our own common sense, our in-house experiences, the results from site-visit case studies, and comments from the more than 53,000 of our many readers who have shared their experiences with us via e-mail (the Survey Forms).

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Update Policy

FLAAR Reports on UV-curable roll-to-roll, flatbed, hybrid, and combo printers are updated when new information is available. We tend to update the reports on new printers, on printers that readers ask about the most, and on printers where access is facilitated (such as factory visits, demo-room visits, etc).

Reports on obsolete printers, discontinued printers, or printers that not enough people ask about, tend not to be updated.

Reports on inks, media, substrates, cutters, etc. tend not to be updated because we have so many new products to evaluate. It is not realistic, timewise, or costs involved, to update old reports (nor old web pages). But we do spend a lot of effort doing research at printer and signage expos around the world so that we can write new reports.

Please Note

This report has not been licensed to any printer manufacturer, distributor, dealer, sales rep, RIP company, media, or ink company to distribute. So, **if you obtained this from any company, you have a pirated copy.**

If you have received a translation, this translation is not authorized unless posted on a FLAAR web site, and may be in violation of copyright (plus if we have not approved the translation it may make claims that were not our intention).

Also, since this report is frequently updated, if you got your version from somewhere else, it may be an obsolete edition. FLAAR reports are being updated all year long, and our comment on that product may have been revised positively or negatively as we learned more about the product from end users.

If you receive any FLAAR Report from a sales rep, in addition to being violation of copyright, it is useful to know if there is a more recent version on the FLAAR web site, because every month new UV printers are being launched. So what was good technology one month, may be replaced by a much better printer elsewhere the next month.

To obtain a legitimate copy, which you know is the complete report with nothing erased or changed, and hence a report with all the original description of pros and cons, please obtain your original and full report straight from www.large-format-printers.org or other pertinent FLAAR web sites.

Your only assurance that you have a complete and authentic evaluation which describes all aspects of the product under consideration, benefits as well as deficiencies, is to obtain these reports directly from FLAAR, via www.wide-format-printers.NET.

Citing and Crediting

A license from FLAAR is required to use any material whatsoever from our reports in any commercial advertisement or PR Release.

If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to ask us first. FLAAR reports are being updated every month sometimes, and our comment on that product may have been revised as we learned more about the product from end users. Also, we noticed that one company cited the single favorable comment we made on one nice aspect of their printer, but neglected to cite the rest of the review which pointed out the features of the printer which did not do so well. For them to correct this error after the fact is rather embarrassing. So it is safer to ask-before-you-quote a FLAAR review on your product.

The material in this report is not only copyright, it is also based on years of research. Therefore if you cite or quote a pertinent section, please provide a proper credit, which would be minimally "Nicholas Hellmuth, year, www.FLAAR.org." If the quote is more than a few words then academic tradition would expect that a footnote or entry in your bibliography would reference the complete title. Publisher would be www.FLAAR.org.

If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to license the report or otherwise notify us in advance. FLAAR reports are being updated every week sometimes, and our comment on that product may have been revised as we learned more about the product from end users. Also, we noticed that one company cited the single favorable comment we made on one nice aspect of their printer, but neglected to cite the rest of the review which pointed out the features of the printer which did not do so well. For them to correct this error after the fact is rather embarrassing. So it is safer to ask-before-you-quote a FLAAR review on your product.

Legal notice

Inclusion in this study by itself in no way endorses any printer, media, ink, RIP or other digital imaging hardware or software. Equally, exclusion from this study in no way is intended to discredit any printer.

A printer may change components since we first reviewed it. A component may be defective in the specific machine you buy (which is obviously not the specific machine we evaluated). And in some factories they may have forgotten to screw a particular part in correctly. So that component may break or wear out, and cause downtime (or injury to the printer operator). There is no realistic way even an evaluation can offer protection from such normal issues with one manufacturing run.

An ink may change components and sources of chemicals. So an evaluation we do in 2014 on an ink may apply only to the formula of the ink made that year. Almost every ink company in the world has an occasional bad batch. An ethical ink company refunds purchase price if the bad batch was the fault of the ink factory, however heat or humidity during shipping or even in your own print shop can cause issues as well (which are not the direct fault of the ink factory).

Advisory

We do our best to obtain information which we consider reliable. But with hundreds of makes and models of printers, inks, materials and other products, and sometimes when information about them is sparse, or conflicting, we can only work with what we have available. Thus you should be sure to rely also on your own research, especially asking around. Find another trustworthy end-user of the same make and model you need to know about. Do not make a decision solely on the basis of a FLAAR report because your situation may be totally different than ours. Or we

may not have known about, and hence not written about, one aspect or another which is crucial before you reach your decision.

The sources and resources we may list are those we happen to have read. There may be other web pages or resources that we missed. For those pages we do list, we have no realistic way to verify the veracity of all their content. Use your own common sense plus a grain of salt for those pages which are really just PR releases or outright ads.

We are quite content with the majority of the specific printers, RIPs, media, and inks we have in the FLAAR facilities. We would obviously never ask for hardware, software, or consumables that we knew in advance would not be good. However even for us, a product which looks good at a trade show, sounds good in the ad literature, and works fine for the first few weeks, may subsequently turn out to be a lemon.

Or the product may indeed have a glitch but one that is so benign for us, or maybe we have long ago gotten used to it and have a workaround. And not all glitches manifest themselves in all situations, so our evaluator may not have been sufficiently affected that he or she made an issue of any particular situation. Yet such a glitch that we don't emphasize may turn out to be adverse for your different or special application needs.

Equally often, what at first might be blamed on a bad product, often turns out to be a need of more operator experience and training. More often than not, after learning more about the product it becomes possible to produce what it was intended to produce. For this reason it is crucial for the FLAAR team and their university colleagues to interact with the manufacturer's training center and technicians, so we know more about a hardware or software. Our evaluations go through a process of acquiring documentation from a wide range of resources and these naturally include the manufacturer itself. Obviously we take their viewpoints with a grain of salt but often we learn tips that are worthy of being passed along.

FLAAR has no way of testing 400+ specifications of any printer, much less the over 101 different UV printers from more than 46 manufacturers. Same with hundreds of solvent printers and dozens of water-based printers. We observe as best we can, but we cannot take each printer apart to inspect each feature. And for UV printers, these are too expensive to move into our own facilities for long-range testing, so we do as best as is possible under the circumstances. And when a deficiency does become apparent, usually from word-of-mouth or from an end-user, it may take time to get this written up and issued in a new release.

Another reason why it is essential for you to ask other printshop owners and printer operators about how Brand X and Y function in the real world is that issues may exist but it may take months for these issues to be well enough known for us to know the details. Although often we know of the issues early, and work to get this information into the PDFs, access to information varies depending on brand and model. Plus with over 300 publications, the waiting time to update a specific report may be several months. Plus, once a printer is considered obsolete, it is not realistic to update it due to the costs involved.

For these reasons, every FLAAR Report tries to have its publication date on the front outside cover (if we updated everything instantly the cost would be at commercial rates and it would not be possible to cover these expenses). At the end of most FLAAR Reports there is additionally a list of how many times that report has been updated. A report with lots of updates means that we are updating that subject based on availability of new information. If there is no update that is a pretty good indication that report has not been updated! With 101 models of UV printers, several hundred solvent printers, and scores of water-based printers, we tend to give priority to getting new reports out on printers about which not much info at all is available elsewhere. So we are pretty good about reporting on advances in LED curing. But glitches in a common water-based printer will take longer to work its way through our system into an update, especially if the glitch occurs only in certain circumstances, for example, on one type of media. With several hundred media types, we may not yet have utilized the problem media. While on the subject of doing your own research, be sure to ask both the printer operator and printshop owner or manager: you will generally get two slightly different stories. A printer operator may be aware of more glitches of the printer than the owner.

If a printer is no longer a prime model then there is less interest in that printer, so unless a special budget were available to update old reports, it is not realistic to update old reports. As always, it is essential for you to visit printshops that have the printers on your short-list and see how they function in the real world.

But even when we like a product and recommend it, we still can't guarantee or certify any make or model nor its profitability in use because we don't know the conditions under which a printer system might be utilized in someone else's facility. For ink and media, especially after-market third-party ink and media, it is essential that you test it first, under your conditions. We have no way to assure that any ink or media will be acceptable for your specific needs in your specific print shop. As a result, products are described "as is" and without warranties as to performance or merchantability, or of fitness for a particular purpose. Any such statements in our reports or on our web sites or in discussions do not constitute warranties and shall not be relied on by the buyer in deciding whether to purchase and/or use products we discuss because of the diversity of conditions, materials and/or equipment under which these products may be used. Thus please recognize that no warranty of fitness or profitability for a particular purpose is offered.

The user is advised to test products thoroughly before relying on them. We do not have any special means of analyzing chemical contents or flammability of inks, media, or laminates, nor how these need to be controlled by local laws in your community. There may well be hazardous chemicals, or outgassing that we are not aware of. Be aware that some inks have severe health hazards associated with them. Some are hazardous to breathe; others are hazardous if you get them on your skin. For example, some chemicals such as cyclohexanone do not sound like chemicals you want to breathe every day. Be sure to obtain, read, and understand the MSDS sheets for the inks, media, and laminates that you intend to use. Both solvent, eco-solvent, and UV-curable inks are substances whose full range of health and

environmental hazards are not yet fully revealed. It is essential you use common sense and in general be realistic about the hazards involved, especially those which are not listed or which have not yet been described. FLAAR is not able to list all hazards since we are not necessarily aware of the chemical components of the products we discuss. Our reports are on usability, not on health hazards.

Most inks are clearly not intended to be consumed. Obviously these tend to be solvent inks and UV-curable inks. Yet other inks are edible, seriously, they are printed on birthday cakes. Indeed Sensient is a leader in a new era of edible inks. Therefore the user must assume the entire risk of ascertaining information on the chemical contents and flammability regulations relative to inks, media or laminates as well as using any described hardware, software, accessory, service, technique or products.

We have no idea of your client's expectations. What students on our campus will accept may not be the same as your Fortune 500 clients. In many cases we have not ourselves used the products but are basing our discussion on having seen them at a trade show, during visiting a print shop, or having been informed about a product via e-mail or other communication.

Results you see at trade shows may not be realistic

Be aware that trade show results may not be realistic. Trade shows are idealized situations, with full-time tech support to keep things running. The images at a trade show may be tweaked. Other images make be "faked" in the sense of slyly putting on primer without telling the people who inspect the prints. Most UV inks don't stick to all materials; many materials need to be treated. Or the UV prints may be top-coated so that you can't do a realistic scratch test.

Booth personnel have many standard tricks that they use to make their output look gorgeous. In about half the cases you will not likely obtain these results in real life: in most cases they are printing uni-directional, which may be twice as slow as bi-directional.

Trade show examples tend to be on the absolutely best media. When you attempt to save money and use economy media you will quickly notice that you do not get anywhere near the same results as you saw in the manufacturer's trade show booth, or pictured in their glossy advertisement. Five years ago we noticed Epson was laminating prints to show glossy output because their pigmented inks could not print on actual glossy media. The same equipment, inks, media, and software may not work as well in your facility as we, or you, see it at a trade show. All the more reason to test before you buy; and keep testing before you make your final payment. Your ultimate protection is to use a gold American Express credit card so you can have leverage when you ask for your money back if the product fails.

Images printed at trade show may be in uni-directional mode: so you may not realize the printer has bi-directional (curing) banding defects until you unpack it in your printshop. Bi-directional curing

banding is also known as the lawnmower effect. Many printers have this defect; sometimes certain modes can get rid of it, but are so slow that they are not productive.

You absolutely need to do print samples with your own images and the kind provided by your clients. Do not rely on the stock photos provided by the printer, ink, media, or RIP manufacturer or reseller. They may be using special images which they know in advance will look fabulous on their printer. Equally well, if you send your sample images to the dealer, don't be surprised if they come back looking awful. That is because many dealers won't make a serious effort to tweak their machine for your kind of image. They may use fast speed just to get the job done (this will result in low quality). Check with other people in your area, or in the same kind of print business that you do. Don't rely on references from the reseller or manufacturer (you will get their pet locations which may be unrealistically gushy): find someone on your own.

Factors influencing output

Heat, humidity, static, dust, experience level of your workers (whether they are new or have prior years experience): these are all factors that will differ in your place of business as compared with test results or demo room results.

Actually you may have people with even more experience than we do, since we deliberately use students to approximate newbies. FLAAR is devoted to assisting newcomers learn about digital imaging hardware and software. This is why Nicholas Hellmuth is considered the "Johnny Appleseed" of wide format inkjet printers.

Therefore this report does not warranty any product for any quality, performance or fitness for any specific task, since we do not know the situation in which you intend to use the hardware or software. Nor is there any warranty or guarantee that the output of these products will produce salable goods, since we do not know what kind of ink or media you intend to use, nor the needs of your clients. A further reason that no one can realistically speak for all aspects of any one hardware or software is that each of these products may require additional hardware or software to reach its full potential.

For example, you will most likely need a color management system which implies color measurement tools and software. To handle ICC color profiles, you may need ICC color profile generation software and a spectrophotometer since often the stock pre-packaged ICC color profiles which come with the ink, media, printers and/or RIPs may not work in your situation. Not all RIPs handle color management equally, or may work better for some printer-ink-media combinations than for others.

Be aware that some RIPs can only accept ICC color profiles: you quickly find out the hard way that you can't tweak these profiles nor generate new ones. So be sure to get a RIP which can handle all aspects of color management. Many RIPs come in different levels. You may buy one level and be disappointed that the RIP won't do everything. That's because those features you may be

lacking are available only in the next level higher of that RIP, often at considerable extra cost. Same thing in the progression of Chevy through Pontiac to Cadillac, or the new Suburbans. A Chevy Suburban simply does not have all the bells and whistles of the Cadillac Escalade version of this SUV.

Don't blame us... besides, that's why we are warning you. This is why we have a Survey Form, so we can learn when you find products that are inadequate. We let the manufacturers know when end users complain about their products so that the manufacturers can resolve the situation when they next redesign the system.

Most newer printer models tend to overcome deficiencies of earlier models. It is possible that our comparative comments point out a glitch in a particular printer that has been taken care of through an improvement in firmware or even an entirely new printer model. So if we point out a deficiency in a particular printer brand, the model you may buy may not exhibit this headache, or your kind of printing may not trigger the problem. Or you may find a work-around.

Just remember that every machine has quirks, even the ones we like. It is possible that the particular kind of images, resolution, inks, media, or other factors in your facility are sufficiently different than in ours that a printer which works just fine for us may be totally unsatisfactory for you and your clients. However it may be that the specific kind of printing you need to do may never occasion that shortcoming. Or, it may be that your printer was manufactured on a Monday and has defects that are atypical, show up more in the kind of media you use which we may not use as often or at all during our evaluations. Equally possibly a printer that was a disaster for someone else may work flawlessly for you and be a real money maker for your company.

So if we inspect a printer in a printshop (a site-visit case study), and that owner/operator is content with their printer and we mention this; don't expect that you will automatically get the same results in your own printshop.

In some cases a product may work better on a Macintosh than on a PC. RIP software may function well with one operating system yet have bugs and crash on the same platform but with a different operating system. Thus be sure to test a printer under your own specific work conditions before you buy.

And if a printer, RIP, media, or ink does not function, return it with no ands, ifs or buts. Your best defense is to show an advertising claim that the printer simply can't achieve. Such advertising claims are in violation of federal regulations, and the printer companies know they are liable for misleading the public.

But before you make a federal case, just be sure that many of the issues are not user error or unfamiliarity. It may be that training or an additional accessory can make the printer do what you need it to accomplish. Of course if the printer ads did not warn you that you had to purchase the additional pricey accessory, that is a whole other issue. Our reviews do not cover accessories since they are endless, as is the range of training, or lack thereof, among users.

The major causes of printer breakdown and failure is lack of maintenance, poor maintenance, spotty maintenance, or trying to jerry-rig some part of the printer. The equally common cause of printer breakdown is improper use, generally due from lack of training or experience. Another factor is whether you utilize your printer all day every day. Most solvent and UV printers work best if used frequently. If you are not going to use your printer for two or three days, you have to put flush into the system and prepare it for hibernation (even if for only four or five days). Then you have to flush the ink system all over again.

Also realize that the surface of inkjet prints are fragile and generally require lamination to survive much usage. Lamination comes in many kinds, and it is worth finding a reliable lamination company and receiving training on their products.

Also realize that no hybrid or combo UV printer can feed all kinds of rigid materials precisely. Some materials feed well; others feed poorly; others will skew.

Although we have found several makes and models to work very well in our facilities, how well they work in your facilities may also depend on your local dealer. Some dealers are excellent; others just sell you a box and can't provide much service after the sale. Indeed some low-bid internet sales sources may have no technical backup whatsoever. If you pay low-bid price, you can't realistically expect special maintenance services or tech support later on from any other dealer (they will tell you to return to where you paid for the product). This is why we make an effort to find out which dealers are recommendable. Obviously there are many other dealers who are also good, but we do not always know them. To protect yourself further, always pay with a level of credit card which allows you to refuse payment if you have end up with a lemon. A Gold American Express card allows you to refuse payment even months after the sale. This card may also extend your warranty agreement in some cases (check first).

Most of the readers of the FLAAR Reports look to see what printers we use in our own facilities. Readers realize that we will have selected the printers that we like based on years of experience and research. Indeed we have met people at trade shows who told us they use the FLAAR web site reports as the shopping list for their corporate purchases.

Yes, it is rather self-evident that we would never ask a manufacturer to send a product which we knew in advance from our studies was no good. But there are a few other printers which are great but we simply do not have them in our facilities yet.

So if a printer is not made available by its manufacturer, then there is no way we can afford to have all these makes and models in our facility. Thus to learn about models which we do not feature, be sure to ask around in other print shops, with IT people in other corporations, at your local university or community college. Go to trade shows....but don't use only the booth...ask questions of people in the elevator, in line at the restaurant, anywhere to escape the smothering hype you get in the booth.

Realize that a FLAAR Report on a printer is not by itself a recommendation of that printer. In your local temperature, in your local humidity, with the dust that is in your local air, with your local operator, and with disorientation of the insides of a printer during rough shipment and installation, we have no knowledge of what conditions you will face in your own printshop. We tend to inspect a printer first in the manufacturing plant demo room: no disjointed parts from any shipment since this printer has not been lifed by cranes and run over a rough pot-holed highway or kept in smelting heat or freezing cold during shipment.

Taking into consideration we do not know the conditions in which you may be using your hardware, software, or consumables, neither the author nor FLAAR nor either university is liable for liability, loss or damage caused either directly or indirectly by the suggestions in this report nor by hardware, software, or techniques described herein because.

Availability of spare parts may be a significant issue

Chinese printers tend to switch suppliers for spare parts every month or so. So getting spare parts for a Chinese printer will be a challenge even if the distributor or manufacturer actually respond to your e-mails at all. Fortunately some companies to have a fair record of response; Teckwin is one (based on a case of two problematical hybrid UV printers in Guatemala). The distributor said that Teckwin sent a second printer at their own expense and sent tech support personnel at their expense also. But unfortunately both the hybrid UV printers are still abandoned in the warehouse of the distributor; they were still there in January 2009. But Teckwin has the highest rating of any Chinese company for interest in quality control and realization that it is not good PR to abandon a client or reseller or distributor all together.

Recently we have heard many reports of issues of getting parts from manufacturers in other countries (not Asia). So just because you printer is made in an industrialized country, if you are in the US and the manufacturer is X-thousand kilometers or miles away, the wait may be many days, or weeks.

Lack of Tech Support Personnel is increasing

The lack of sales in the third quarter of 2008 resulted in many tech support problems.

The recession resulted in even more: some manufacturers may need to skimp on quality control during a recession, or switch to cheaper parts suppliers. Plus they are not hiring enough tech support during a recession. So the bigger and more successful the company, in some cases the worse these particular problems may be.

Notice about issues with tech support

If you buy a printer direct from the factory, and if there is no distributor in your home country, it is not realistic to expect tech support and spare parts in subsequent years.

We have received e-mails from two individuals in different countries who indicated that tech support after about two years was difficult. One bought through a distributor but the distributor went out of business. This meant he had no tech support person.

The other print shop bought from the factory, and after several years had difficulty getting tech support.

This will be comparable for any brand.

In other words: if there is a distributor in your country, you should get some tech support the first year or two, depending on the capability of the distributor. But gradually it may be more difficult to obtain tech support and spare parts.

But if the distributor fails, it is not realistic to blame the manufacturer.

This situation varies per country, but what we mention here is reality even if the printer is made in Europe. A factory is for manufacturing; the distributor is for tech support.

Fortunately there are many capable and supportive distributors, but we have no way to keep track of every distributor for the over 50 factories which produce UV-cured printers.

When a distributor drops distribution, you may get no more tech support!

If your distributor has issues with the manufacturer, you may be abandoned if that distributor drops the product.

If another distributor takes up that product, they may not provide you tech support because you did not buy the printer from them.

Occasionally even the manufacturer goes bankrupt!

Even major Swiss printer manufacturers have had issues and gone out of business (for their wide-format printers). THREE Swiss manufacturers are in this list actually. There are also companies in Canada, USA, and Europe which had corporate meltdown: Gandinnovations is the best example but there are many others. Neolt recently went into reorganization (July 2012) (a polite way of saying downsizing after filing a court case which would be roughly comparable to Chapter 11 in the USA). Most companies studiously avoid using the word "pleading bankruptcy" but to a lay person it's very close to the same.

In some cases the company continues (Neolt we hope is in this category).

Or sometimes a manufacturer simply runs out of money. They avoid publically announcing this but the effect is similar to Chapter 11 or bankruptcy: downsizing, and technical support may drop. Plus you may not get much innovation from a company which can't afford to pay its bills.

Any new printer may take a few months to break in

Any new printer, no matter who the manufacturer, or how good is the engineering and electronics, will tend to have teething issues. Until the firmware is updated, you may be a beta tester. This does not mean the printer should be avoided, just realize that you may have some downtime and a few headaches. Of course the worst case scenario for this was the half-million dollar Luscher JetPrint: so being "Made in Switzerland" was not much help.

Counterfeit parts are a problem with many printers made in China

Several years ago many UV printers made in China and some made elsewhere in Asia had counterfeit parts. No evaluation has the funding available to check parts inside any printer to see if they are from the European, Japanese, or American manufacturer, or if they are a clever counterfeits. So when we mention a brand name, this is a brand name; this is not a guarantee the part is not counterfeited.

Be realistic and aware that not all materials can be printed on equally well

Many materials don't feed well through hybrid (pinch roller on grit roller systems) or combo UV systems (with transport belts). Banding, both from poor feeding, and from bi-directional (lawnmower effect) are common on many UV-curable inkjet printers.

It is typical for some enthusiastic vendors to claim verbally that their printer can print on anything and everything. But once you unpack the printer and set it up, you find that it requires primer on some materials; on other materials it adheres for a few weeks but then falls off.

And on most hybrid and many combo printers, some heavy, thick, or smooth-surfaced materials skew badly. Since the claim that the printer will print on everything is usually verbal, it is tough to prove this aspect of misleading advertising to a jury.

Not all inks can print on all materials. And at a trade show, many of the materials you see so nicely printed on, the manufacturer may be adding a primer at night or early in the morning: before you see the machine printing on this material.

We feel that the pros and cons of each product speak more than adequately for themselves. Just position the ad claims on the left: put the actual performance results on the right. The unscrupulous hype for some printers is fairly evident rather quickly.

Be sure to check all FLAAR resources

Please realize that with over 200 different FLAAR Reports on UV printers, inks and other products you need to be sure to check the more obscure ones too. If a printer has a printhead issue, the nitty gritty of this may be in the FLAAR Report on printheads. The report on the model is a general introduction; if we discussed the intimate details of printheads then some readers might fall asleep. And obviously do not limit yourself to the free reports. The technical details may be in the reports that have a price to them. Our readers have said they prefer to have the general basics, and to park the real technical material in other reports that people can buy if they really want that level of information.

So it may be best to ask for personal consulting. The details of the problems with the ColorSpan 5400uv series are rather complex: namely the center row of the Ricoh printheads. This would require an expensive graphic designer and consultants to show the details. And the design of the printhead would probably be altered by the time we did any of this anyway. So it is essential to talk with people: with other end-users, and with FLAAR in person on a consulting basis.

Acknowledgements

With 19 employees the funding has to come from somewhere, so we do welcome project sponsorship, research grants, contributions that facilitate our educational programs, scholarships for co-op interns and graduate students, and comparable project-oriented funding from manufacturers. The benefit for the end-user is a principle called academic freedom, in this case,

- the freedom of a professor or student to speak out relative to the pros and cons of any equipment brought to them to benchmark.
- The freedom to design the research project without outside meddling from the manufacturer.

Fortunately, our budget is lean and cost effective as you would expect for a non-profit research institute. As long as we are not desperate for money we can avoid the temptation to accept payment for reprinting corporate PR hype. So the funding is used for practical research. We do not accept (nor believe) and certainly do not regurgitate corporate PR. For example, how many manufacturer's PR photos of their products have you seen in our reports or on our web sites?

Besides, it does not take any money to see which printers and RIPs function as advertised and which don't. We saw one hyped printer grind to a halt, malfunction, or otherwise publicly display its incapacities at several trade shows in a row. At each of those same trade shows another brand had over 30 of their printers in booths in virtually every hall, each one producing museum quality exhibits. Not our fault when we report what we see over

and over and over again. One of our readers wrote us recently, "Nicholas, last month you recommended the as one of several possible printers for our needs; we bought this. It was the best capital expenditure we have made in the last several years. Just wanted to tell you how much we appreciate your evaluations...."

FLAAR is a non-profit educational and research organization dedicated for over 36 years to professional photography in the arts, tropical flora and fauna, architectural history, and landscape panorama photography.

Our digital imaging phase is a result of substantial funding in 1996 from the Japanese Ministry of Public Education for a study of scanning and digital image storage options. This grant was via Japan's National Museum of Ethnology, Osaka, Japan. That same year FLAAR also received a grant of \$100,000 from an American foundation to do a feasibility study of digital imaging in general and the scanning of photographic archives in particular.

The FLAAR web sites began initially as the report on the results of these studies of scanners. Once we had the digital images we began to experiment with digital printers. People began to comment that our reports were unique and very helpful. So by 1999 we had entire sections on large format printers.

FLAAR has existed since 1969, long before inkjet printers existed. Indeed we were writing about digital imaging before HP even had a color inkjet system available. In 2000 FLAAR received an educational grant from Hewlett-Packard large format division, Barcelona, Spain, for training, for equipment, and to improve the design and navigation on the main web sites of the FLAAR Network. This grant ran its natural course, and like all grants, reached its finishing point, in this case late 2005.

In some cases the sponsorship process begins when we hear end-users talking about a product they have found to be better than other brands. We keep our ears open, and when we spot an especially good product, this is the company we seek sponsorship from. It would not be wise of us to seek sponsorship from a company with a sub-standard or otherwise potentially defective printer. So we usually know which printers are considered by end-users to be among the better brands before we seek sponsorship. After all, out of the by now one million readers, we have heard plenty about every single printer out there.

We thank MacDermid ColorSpan (now part of HP), Hewlett-Packard, Parrot Digigraphic, Color DNA, Canon, Gandinnovations, and other companies for providing funding for technology training for the FLAAR staff and our colleagues at Bowling Green State University in past years and for funds to allow us to attend all major international trade shows, which are ideal locations for us to gather information. We thank Sun LLC, Caldera, EskoArtwork, Raster Printers (EFI Rastek), DEC LexJet, DigiFab, Barbieri electronic, Seiko II, Mutoh Europe, IP&I, Dilli, Yuhan-Kimberly, GCC, Grapo, Durst, and WP Digital for providing funds so that we can make more of our publications free to end-users in past years. During 2000-2001 we had grants to cover all the costs of our publications, and all FLAAR Reports were free in those early years. As that early grant naturally expired after a few

years, we had to begin charging for some of our reports to cover costs. Now (in 2014), we are seeking corporate sponsorship so we can gradually make another 20% of our publications free to our readers.

Since 2006 we do a major part of our evaluations at a factory and headquarters demo room. Since the university does not fund any of these trips, it is traditional for the manufacturer to fund a research sponsorship. In the US this is how most university projects are initiated for decades now, and it is increasing. In fact there is a university in Austria that is not an "edu" but is a "GmbH", funded by the chamber of commerce of that part of Austria. In other words, a university as an educational institution, but functioning in the real world as an actual business. This is a sensible model, especially when FLAAR staff need to be on the road over a quarter of a million miles per year (roughly over 400,000 km per year total for the staff). Obviously this travel is hosted since unless money falls from heaven there most realistic way to obtain funding to get to the demo rooms for training is direct from the source.

It has been helpful when companies make it possible for us to fly to their headquarters so we can inspect their manufacturing facilities, demo rooms, and especially when the companies make their research, engineering and ink chemistry staff available for discussions. When I received my education at Harvard I was taught to have a desire to learn new things. This has guided my entire life and is what led me into wide-format digital imaging technology: it is constantly getting better and there is a lot to learn every month. Thus I actively seek access to improving my understanding of wide format printer technology so that we can better provide information to the approximately quarter-million+ readers of our solvent and UV printer web site (www.large-format-printers.org) and the over half a million who read either our wide-format-printers.org site or our roughly half million combined who read our digital-photography.org and www.FineArtGicleePrinters.org sites.

Barbieri electronic (color management), Caldera (RIP), ColorSpan, DEC, Durst, EskoArtwork, Gerber, Grapo, IP&I, JETRIX, Mimaki USA, Mutoh, Dilli, GCC, NUR, Oce, Shiraz (RIP), Sky AirShip, Sun, Teckwin, VUTEk, WP Digital, Xerox, Yuhan-Kimberly, Zund have each brought FLAAR staff to their headquarters and printer factories.

Bordeaux, Inktec, Hongsam, InkWin, Jetbest, Sam-Ink, and Sunflower ink have brought us to inspect their ink manufacturing facilities and demo rooms. Of these we have maintained contact with Hongsam and Sam-Ink, a polite way of saying that we have no recent information on any of the other brands of inks. But we have visited Hongsam and Sam-Ink several times, including in 2014.

We have visited the world headquarters and demo rooms of HP in Barcelona and received informative and helpful technology briefings roughly every two years in past years. We are under NDA as to the subjects discussed but it is important that we be open where we have visited. Mimaki Europe has had FLAAR as their guest in Europe to introduce their flatbed UV printer, as have other UV-curable manufacturers, again, under NDA as to the details since often we are present at meetings where unreleased

products are discussed. Xaar has hosted an informative visit to their world headquarters in the UK. You don't get this level of access from a trade magazine writer, and I can assure you, we are provided much more detailed information and documentation in our visits than would be provided to a magazine author or editor. Companies have learned that it's a lot better to let us know up front and in advance the issues and glitches with their printers, since they now know we will find out sooner or later on our own. They actually tell us they realize we will find out on our own anyway.

Contributions, grant, sponsorships, and project funds from these companies are also used to improve the design and appearance of the web sites of the FLAAR Information Network. We thank Canon, ColorSpan, HP, ITNH, and Mimaki for providing wide format printers, inks, and media to the universities where FLAAR does research on wide format digital imaging. We thank Epson America for providing an Epson 7500 printer many years ago, and Parrot Digigraphic for providing three different models of Epson inkjet printers to our facilities on loan at BGSU (5500, 7600, 7800). We thank Mimaki USA for providing a JV4 and then a Mimaki TX-1600s textile printer and Improved Technologies (ITNH) providing their Ixia model of the Iris 3047 giclee printer.

We thank 3P Inkjet Textiles and HP for providing inkjet textiles so we could learn about the different results on the various textiles. IJ Technologies, 3P Inkjet Textiles, ColorSpan, Encad, HP, Nan Ya Pepa, Oracal, Tara and other companies have provided inkjet media so we can try it out and see how it works (or not as the case may be; several inkjet media failed miserably, one from Taiwan, the other evidently from Germany!). We thank Aurelon, Canon, ColorGate, ColorSpan, ErgoSoft, HP, PerfectProof, PosterJet, Onyx, Ilford, CSE ColorBurst, ScanvecAmiable, Wasatch and many other RIP companies for providing their hardware and software RIPs.

We thank Dell Computers for providing awesome workstations for testing RIP software and content creation with Adobe Photoshop and other programs. We also appreciate the substantial amount of software provided by Adobe. As with other product loaned or provided courtesy of ProVar LLC (especially the 23" monitors which makes it so much easier to work on multiple documents side by side).

We thank Betterlight, Calumet Photographic, Global Graphics, Westcott, Global Imaging Inc. Phase One, and Bogen Imaging for helping to equip our archaeological photo studios at the university and its archaeology museum in Guatemala. Heidelberg, Scitex, CreoScitex (now Kodak) and Cruse, both in Germany, have kindly provided scanners for our staff to evaluate.

We really liked some of the results whereas some of the other products were a bit disappointing. Providing samples does not influence the evaluations because the evaluators are students, professors, and staff of Bowling Green State University. These personnel are not hired by any inkjet printer company; they were universities employees (as was also true for Nicholas Hellmuth). The testing person for the HP ColorPro (desktop printer) said he frankly preferred his Epson printer. When we saw the rest results we did not include this Hewlett-Packard ColorPro printer on our list of recommended printers, but we love our HP DesignJet 5000ps so much we now have two of them, one at each university.

Sometimes we hear horror stories about a printer. The only way we can tell whether this is the fault of the printer design, or lack of training of the operator, is to have the printer ourselves in-house. Of course some printer manufacturers don't understand the reasons we need to have each make and model; they are used to loaning their demo units for a week or so. That is obviously inadequate for a serious review.

Some of the media provided to us failed miserably. Three printers failed to meet common sense usability and printability standards as well (HP 1055, one older desktop model (HP Color Pro GA), and one Epson). Yet we know other users who had better results; maybe ours came down the assembly line on a Monday or Friday afternoon, when workers were not attentive. One costly color management software package was judged "incapable" by two reviewers (one from the university; second was an outside user who had made the mistake of buying this package).

So it's obvious that providing products or even a grant is no shield from having your products fail a FLAAR evaluation. The reason is clear: the end user is our judge. The entire FLAAR service program is to assist the people who need to use digital imaging hardware and software. If a product functions we find out and promulgate the good news. If a product is a failure, or more likely, needs some improvement in the next generation, we let people know. If a product is hyped by what an informed user would recognize as potentially false and misleading nonsense, then we point out the pathetic discrepancies very clearly.

This is what you should expect from an institute which is headed by a professor.

Actually, most of our reviews are based on comments by end users. We use their tips to check out pros and cons of virtually every product we discuss. You can't fool a print shop owner whose printer simply fails to function as advertised. And equally, a sign shop owner who earns a million dollars a year from a single printer brand makes an impact on us as well. We have multiple owners of ColorSpan printers tell us that this printer is their real money earner for example. We know other print shops where their primary income is from Encad printers. Kinkos has settled on the HP 5000 as its main money maker production machine, and so on.

Yet we have documentation of several print shop companies whose business was ruined by specific brands that failed repeatedly. It is noteworthy that it is always the same brand or printer at both locations: one due to banding and printheads then simply no longer printing one color; the other brand due to pokiness of the printer simply not being competitively fast enough. Same with RIPs, we have consistent statements of people using one RIP, and only realizing how weak it was when they tried another brand which they found substantially better. Thus we note that companies which experiment with more than one brand of product tend to realize more quickly which brand is best. This is where FLAAR is in an ideal situation: we have nine RIPs and 25 printers. Hence it is logical that we have figured out which are best for our situation.

Grant funding, sponsorship, demonstration equipment, and training are supplied from all sides of the spectrum of printer equipment and software engineering companies. Thus, there is no incentive to favor one faction over another. We receive support from three manufacturers of thermal printheads (Canon, ColorSpan and HP) and also have multiple printers from three manufacturers of piezo printers (Epson, Seiko, Mutoh, and Mimaki). This is because piezo has definite advantage for some applications; thermal printheads have advantages in different applications. Our reviews have universal appeal precisely because we feature all competing printhead technologies. Every printer, RIPs, inks, or media we have reviewed have good points in addition to weaknesses. Both X-Rite and competitor GretagMacbeth provided spectrophotometers. Again, when all sides assist this program there is no incentive to favor one by trashing the other. Printer manufacturer ad campaigns are their own worst enemy. If a printer did not make false and misleading claims, then we would have nothing to fill our reviews with refuting the utter nonsense that is foisted on the buying public.

It is not our fault if some printers are more user friendly, print on more media than other brands. It is not our fault that the competing printers are ink guzzlers, are slow beyond belief, and tend to band or drop out colors all together. We don't need to be paid by the printer companies whose products work so nicely in both our universities on a daily basis. The printers which failed did so in front of our own eyes and in the print shops of people we check with. And actually we do try to find some redeeming feature in the slow, ink gulping brands: they do have a better dithering pattern; they can take thick media that absolutely won't feed through an HP. So we do work hard at finding the beneficial features even of printers are otherwise get the most critique from our readers. Over one million people will read the FLAAR Information Network in the next 12 months; 480,000 people will be exposed to our reports on wide format printers from combined total of our three sites on these themes. You can be assured that we hear plenty of comments from our readers about which printers function, and which printers fail to achieve what their advertising hype so loudly claims.

An evaluation is a professional service, and at FLAAR is based on more than 14 years of experience. An evaluation of a printer, an ink, media, substrate, a software, laminator, cutter or whatever part of the digital printing workflow is intended to provide feedback to all sides. The manufacturers appreciate learning from FLAAR what features of their printers need improvement. In probably half the manufacturers FLAAR has dealt with, people inside the company did not, themselves, want to tell their boss that their pet printer was a dog. So printer, software, and component manufacturers have learned that investing in a FLAAR evaluation of their product provides them with useful return on investment. Of course if a printer manufacturer wants only a slick Success Story, or what we call a "suck up review" that simply panders to the manufacturer, obviously FLAAR is not a good place to dare to ask for such a review. In several instances it was FLAAR Reports that allowed a company to either improve their printer, or drop it and start from scratch and design a new and better one.

And naturally end-users like the opportunity to learn about various printers from a single source that covers the entire range from UV through latex through all flavors of solvent.

We have also learned that distributors often prefer to accept for distribution a printer or other product on which a FLAAR Report already exists.

We turn down offers of funding every year. These offers come from PO Box enterprises or products with no clearly visible point of manufacture. Usually the company making the offer presumes they can buy advertising space just by paying money. But that is not what our readers want, so we politely do not accept such offers of money.

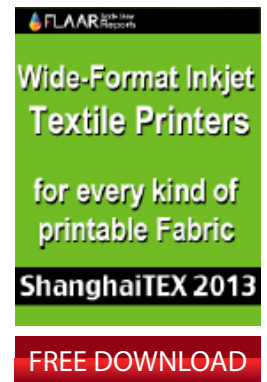
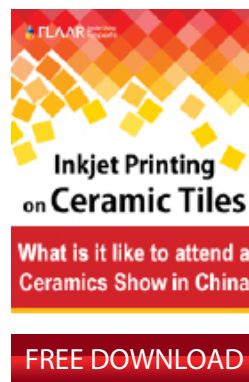
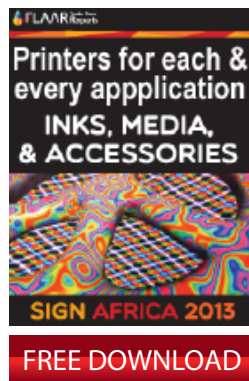
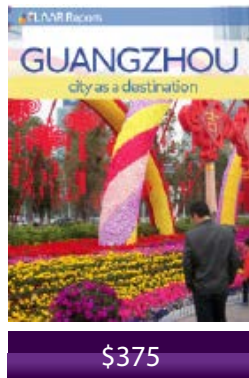
Contributions, grants, sponsorships, and funding for surveys, studies and research is, however, open to a company who has an accepted standing in the industry. It is helpful if the company has a visible presence at leading trade shows and can provide references from both end users and from within the industry. Where possible we prefer to visit the company in person or at least check them out at a trade show. Obviously the product needs to have a proven track record too. Competing companies are equally encouraged to support the FLAAR system. We feel that readers deserve to have access to competing information. Competition is the cornerstone of American individualism and technological advancement.

FLAAR also covers its costs of maintaining the immense system of 8 web sites in three languages and its facilities in part by serving as a consultant such as assisting inkjet manufacturers learn more about the pros and cons of their own printers as well as how to improve their next generation of printers. It is especially useful to all concerned when manufacturers learn of trends (what applications are popular and for what reasons). For example, manufacturers need to know whether to continue designing software for Mac users, or concentrate software for PC users. So the survey form that you fill out is helpful to gather statistics. You benefit from this in two ways: first, you get the FLAAR reports in exchange for your survey form. Second, your comments bring (hopefully) change and improvement in the next generation of printers. When we do survey statistics, then the names, addresses, and telephone numbers are removed completely. A survey wants only aggregate numbers, not individuals. However, if you ask about a specific brand of printer, and do not opt out, we forward your request to a pertinent sponsor so you can obtain follow-up from that brand, since we ourselves do not have enough personnel to respond to each reader by telephone. But we do not provide your personal information to outsiders and our survey form has an opt out check-off box which we honor.

FLAAR also serves as consultants to Fortune 500 companies as well as smaller companies and individuals who seek help on which printers to consider when they need digital imaging hardware and software.

A modest portion of our income comes from our readers who purchase the FLAAR series. All income helps continue our tradition of independent evaluations and reviews of inkjet printers, RIPs, media, and inks.

Trade Show Reports



Textile Reports



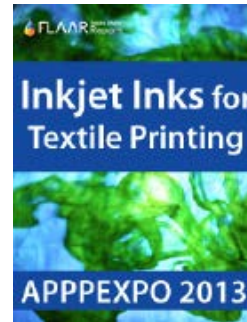
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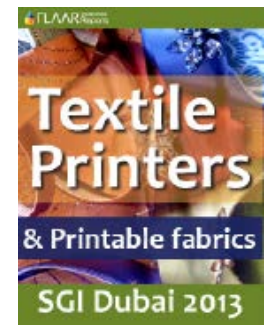
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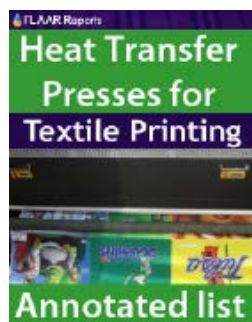
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UV Reports



\$3200



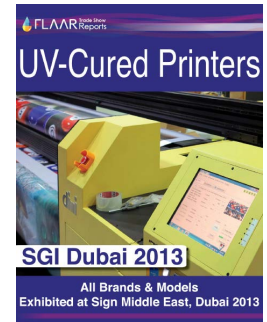
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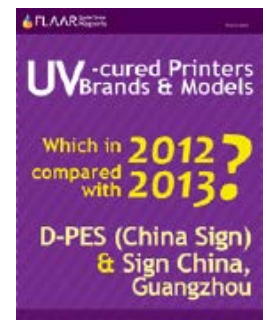
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Ink Reports



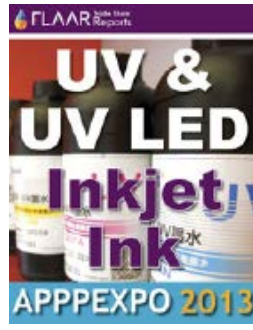
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\$210



\$320



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FREE DOWNLOAD



FREE DOWNLOAD

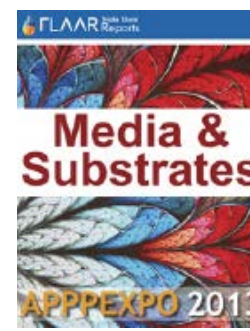
Media Reports



\$220



\$220



\$220



\$220



\$120



\$324



\$240



\$320



\$120

CNC Reports

CNC Routers
Sign Istanbul 2013

\$120

Ceramic Reports

Inkjet Printers for Ceramic Floor & Wall Tiles
TRENDS PART I
Ceramics China 2013

\$3200

Inkjet Printers for Ceramic Floor & Wall Tiles
TRENDS PART II
Ceramic China 2013

Ceramic Printers Comparative Tabulation
TRENDS PART III
Ceramic China 2013

Glass Reports

TRENDS
Printers for Glass Wide-format Inkjet
Glasstec 2012

\$2100

TRENDS in Printing on Glass
Observed at Glasstec 2010

\$1200

Inkjet Printers for Glass
Options for printing on glass From Glasstec Expo 2010

\$120

Latex Reports

Wide-format Printers using Latex ink
ISA 2013

\$524

Wide-format Printers using Latex ink
expected at SGI Dubai 2014

\$324

SUV Reports

SUV TRENDS Solvent UV Inkjet Printers
Part I
FESPA 2013

\$420

SUV TRENDS Solvent UV Inkjet Printers
Part II
SGIA 2013

\$420